Machine Translation of Japanese Patent Application Publication 2001-276484

[Document Name]Description

[Title of the Invention]Washing machine

[Claim(s)]

[Claim 1]It is a washing machine which washes this clothing using rinse water which has two or more times of washing processes in order to wash clothing, and is supplied for every time of a washing process of these two or more times, A washing machine, wherein it provides a silver ion addition unit which adds a silver ion to rinse water and a silver ion is supplied as rinse water by the last round of two or more times of washing processes.

[Claim 2]The washing machine according to claim 1, wherein said silver ion addition unit serves as an electrolysis vessel which consists of a silver electrode from a control part which carries out electric power control of the silver electrode.

[Claim 3]The washing machine according to claim 2 being arranged in the middle of a channel into which said electrolysis vessel flows tap water, impressing electric power to an electrolysis vessel in accordance with timing into which tap water flows, and generating silver ion water.

[Claim 4]The washing machine according to claim 3 cutting off water in a place which reached predetermined amount of water which completes electrolysis electric power in a place arrived at at electrolysis time set up beforehand, and is detected with a flow switch etc., and which was set up beforehand.

[Claim 5]4 is a washing machine of a description either from Claim 1, wherein silver concentration of silver ion water used for said washing is not less than 3 ppb and 50 ppb or less.

[Claim 6]5 is a washing machine of a description either from Claim 1 which is the tap water which does not contain a silver ion after washing with silver ion water, and is characterized by rinsing and washing.

[Claim 7]6 is a washing machine of a description either from Claim 1 possessing a switch

which selects whether a washing process in silver ion water is adopted.

[Claim 8]7 is a washing machine of a description either from Claim 1 arranging an indicator which indicates whether rinse water in an inside of a washing machine is silver ion water, and indicating that it is silver ion water when rinse water is silver ion water.

[Claim 9]8 is a washing machine of a description either from Claim 1 to which having washed with silver ion water when it has an indicator which indicates that it washed with silver ion water and washing by silver ion water was completed is characterized by what is displayed.

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to clothing and the washing machine which sterilizes a washing machine tub using the silver ion water containing a silver ion.

[0002]

[Description of the Prior Art]Textiles, such as the socks which carried out antibacterial properties and mildewproofing processing, an underwear, sportswear, a towel, toiletries, pajamas, bedding, nursing care goods, and a dishcloth, are successively commercialized with the clean intention. Although what uses natural antibacterial substances, such as chitosan and hinoki thiol, the thing of an antibacterial effect which added copper, zinc, etc., etc. are various, after washing all, an effect falls. According to the voluntary standards which a textiles health processing conference establishes, even if it washes 10 times, it is a durable valuation basis whether it is effective.

[0003]

[Problem to be solved by the invention]Since antibacterial properties are lost in several wash even if there is an antibacterial effect in early stages, it cannot control being unable to suppress multiplication of a bacillus, therefore becoming smelling of sweat. There is this invention in providing a means to solve said technical problem.

[0004]
[Means for Solving the Problem and its Function and Effect][the invention according to claim 1 made in order to solve the above-mentioned technical problem] It is a washing machine which washes this clothing using rinse water which has two or more times of washing processes in a washing machine in order to wash clothing, and is supplied for every time of two or more times of washing processes, A silver ion addition unit which adds a silver ion to rinse water is provided, and a silver ion is supplied as rinse water by the last round (rinse process) of two or more times of washing processes.

[0005]When this invention person added a silver ion to tap water used by the last round (rinse process) of a washing process, a silver ion remained to a washing machine inner wall of tank, and was sterilized. Although the antibacterial properties of the conventional antibacterial products in which antibacteria medicine was kneaded fell with use, if this invention is followed, the coat of the silver ion will be carried out to clothing, and the antibacterial treatment of them will be carried out to it. That is, an antibacterial treatment is carried out whenever it carries out clothing washing.

[0006]The invention according to claim 2 made in order to solve the above-mentioned technical problem serves as an electrolysis vessel which said silver ion addition unit becomes from a silver electrode from a control part which carries out electric power control of the silver electrode in the washing machine according to claim 1.

[0007]If this invention is followed, it is not necessary to change a channel and a silver ion can be added only by impressing electrolysis electric power to silver inter-electrode according to timing which wants to add silver to add a silver ion. By controlling electrolysis electric power between silver electrodes, since addition concentration of a silver ion is kept constant, antibacterial activity of high reliability is obtained.

[0008]In the washing machine according to claim 2, said electrolysis vessel is arranged in the middle of a channel which flows tap water, electric power is impressed to an electrolysis vessel in accordance with timing into which tap water flows, and the invention according to claim 3 made in order to solve the above-mentioned technical problem generates silver ion water.

[0009]Without rinse water which washed and became dirty carrying out water-contacting [of the clothing], since an electrolysis vessel will be arranged at a channel of tap water if this invention is followed, an electrode surface does not become dirty but water of stable silver ion concentration is generated.

[0010]The invention according to claim 4 made in order to solve the above-mentioned

technical problem cuts off water in the washing machine according to claim 3 in a place which reached predetermined amount of water which completes electrolysis electric power in a place arrived at at electrolysis time set up beforehand, and is detected with a flow switch etc., and which was set up beforehand.

[0011]Amount of water per unit time (the flow velocity) which flows into a washing machine is changed every day, and time to reach predetermined amount of water required for washing is changed every day. By the way, when this invention person inquired and electrolysis control of voltage and current was fixed, the flow velocity of tap water which flows through an electrolysis vessel hardly influenced the amount of silver ion addition per unit time. That is, since a fixed quantity of the amounts of silver ions are added to amount of water which became constant [the amount of addition of a silver ion when only time set up beforehand is electrolyzed], and was set up by a flow switch etc., silver ion concentration of generated rinse water always serves as a fixed value.

[0012]the invention according to claim 5 made in order to solve the above-mentioned technical problem -- either of Claim 1 to 4 -- in a washing machine of a description, it is characterized by silver concentration of silver ion water used for said washing being not less than 3 ppb and 50 ppb or less.

[0013]When this invention person inquired, the antibacterial properties of clothing and the washing machine inner wall of tank were carried out for silver ion concentration at not less than 3 ppb. When silver ion concentration was set to not less than 50 ppb, a tendency for a black discoloration thing of silver compound origin to adhere to clothing and a washing machine inner wall of tank was seen. Therefore, silver ion concentration was considered that not less than 3 ppb of ** and 50 ppb or less are desired.

[0014]From Claim 1, in a washing machine of a description, 5 is the tap water which does not contain a silver ion after washing with silver ion water either, and the invention according to claim 6 made in order to solve the above-mentioned technical problem is rinsed, and is washed.

[0015]When this invention person is the tap water which does not contain silver ion water after washing, rinsed and washed with silver ion water, a tendency for a black discoloration thing of silver compound origin to adhere fell, and antibacterial properties were maintained.

[0016]The invention according to claim 7 made in order to solve the above-mentioned technical problem possesses a switch which selects whether a washing process in silver ion water is adopted from Claim 1 in any of 6, or a washing machine of a description.

[0017]Allergy may be rarely shown to silver. In that case, it is necessary to prevent a silver ion from adhering to clothing etc. If this invention is followed, it will become possible to lose silver ion adhesion in clothing with the switch which selects cancellation of a washing process in silver ion water.

[0018][the invention according to claim 8 made in order to solve the above-mentioned technical problem] either of Claim 1 to 7 -- in a washing machine of a description, an indicator which indicates whether rinse water in an inside of a washing machine is silver ion water is arranged, and when rinse water is silver ion water, it indicates that it is silver ion water

[0019]Allergy may be rarely shown to a silver ion. A seal exception does not attach visually whether rinse water is silver ion water. If it has a means to indicate that it is silver ion water, it turns out visually that it is silver ion water.

[0020]If it has an indicator which indicates that it washed the invention according to claim 9 made in order to solve the above-mentioned technical problem with silver ion water in any of 8, or a washing machine of a description from Claim 1 and washing by silver ion water is completed, it will indicate that it washed with silver ion water.

[0021]Visually, it cannot be distinguished whether the antibacterial treatment was washed and carried out with silver ion water. If it indicates that it washed with silver ion water, having been washed with silver ion water will become possible [checking visually].

[0022]

[Mode for carrying out the invention]Hereafter, this invention is explained based on a work example of illustration. Drawing 1 applies this invention to a swirl-type washing machine. A wash container in which the upper part for wash in which the inside A of the said figure provides in a washing machine, 102 was provided in a case of the washing machine A, and 103 was provided in the case 102 carried out the opening, a solid of revolution for churning by which 104 was provided in the hole 103a of a bottom of the wash container 103, and 105 are motors made to rotate the solid of revolution 104 for churning. A filling port by which 106 was provided in the case 102, and 107 are water supply openings which fill the wash container 103 with water from the filling port 106. The silver ion water generating device B is formed in the course 108 of water between this filling port 106 and the water supply opening 107.

[0023]As shown in drawing 2, the silver ion water generating device B comprised the negative pole 121 and the anode 122, and is provided with the flow rate sensor 210 connected with the water flow pipe 290a. The service pipe 290b prolonged from the flow rate sensor 210 is connected to the relief valve 110. The silver ion water generating device B is provided with the control unit 240 which has a direct-current power supply circuit with variable electric power containing a microcomputer programmed further to control a switching-power-supply circuit and this switching-power-supply circuit.

[0024]The operation of the washing machine A is shown below. As shown in drawing 1 and drawing 2, it is supplied from the cock 100, and the tap water extracted to the predetermined flow by the relief valve 110 flows into the silver ion water generating device B through the course 108 of the pouring mouth 106 and water, and flows through the flow rate sensor 210 and the water flow pipe 290a. A flow is detected by the flow rate sensor 210, and a flow signal is outputted to the control unit 240 from the flow rate sensor 210.

[0025]Electrolytic treatment is carried out by impressing the predetermined voltage and the electrolysis electric power of current which were controlled by the control unit 240 according to the flow of the tap water which flows through the water flow pipe 290a detected by the flow rate sensor 210.

[0026]

[Work example 1]Clothing washing evaluation was performed using the silver ion water produced by electrolyzing based on the work example of drawing 1 and drawing 2. structure specification [of the creation electrolysis vessel of silver ion water]: -- the electrode quality of the material 2-cm x size 2-cm electrode spacing 10-mm electrolysis condition [of a silver electrode]: -- 0 mA - electrolysis voltage 13V electrolytic current 3-mA flow: -- silver ion concentration:0-200ppb of the silver ion which is used for per minute 10L1 washing and which is flow 50L obtained

[0027]Washing condition clothing was put into drawing 1 and a washing machine based on a work example of drawing 2, and the following washing processes were repeated 100 times and performed. Washing process Tap water 50L Washing time 10-minute dehydration process Drying time 3 minute rinse process 1 tap-water 50L Washing time 5-minute dehydration process Drying time 3 minute rinse process 2 silver-ion water 50L Washing time 5-minute dehydration process Drying time 5-minute warm air dry 60 minutes

[0028]A qualitative test (halo test) of an antibacterial test method (JIS L 1902) of valuation method textiles was followed. A result was judged by existence of halo.

[0029](3) Antimicrobial evaluation which was obtained as for the result is shown in drawing 3. Drawing 3 showed the following things. - Antibacterial properties are accepted for Ag ion concentration in clothing at not less than 3 ppb, and breeding of a bacillus in a washing machine tub is suppressed. - As a result of 100 wash cyclic tests, when set to not less than 50 ppb, a case where adhesion of a silver black deposit thing arose occurred but only.

[0030]In this example, silver ion water was rinsed, it was considered as the process 2, and an effect shown in drawing 3 was acquired. An effect was not accepted even if it used silver ion water for a washing process. In this example, it completed at the rinse process 2 and adhesion of a black deposit thing shown in drawing 3 was accepted. It was possible to have reduced generation of a black deposit thing, maintaining antibacterial properties, although some antibacterial performances fell when a rinse process by tap water was added after the rinse process 2.

[0031]Influence of a flow to silver ion concentration generated by electrolysis based on a work example 1 is shown in drawing 4. As shown in drawing 4, even if it changes a flow in between 10L to 20L, silver concentration shows a stable value between 20 to 22 ppb.

[0032]Based on drawing 5, a navigational panel of a work example of this invention is shown. A switch which selects washing conditions [navigational panel / 510 / which is all over the washing machine A], such as an electric power switch and "saving course" "careful course" 520, It consists of the "antibacterial water selection" switch 550 which selects existence of an antibacterial treatment, a lamp in which it is shown that it is under operation, an "antibacterial completion" display which shows that an antibacterial treatment is completed, and a "silver ion water" display which shows that silver ion water remains in a washing machine.

[0033]As mentioned above, although a work example of this invention was described, this invention is not limited to the above-mentioned work example. For example, a silver ion water generating device may be arranged in the lower part of the wash container 103.

[0034]

[Brief Description of the Drawings]

[Drawing 1]It is a lineblock diagram of the washing machine concerning the work example of this invention.

[Drawing 2]It is a lineblock diagram of the silver ion water generating device with which the washing machine concerning the work example of this invention is provided.

[Drawing 3]It is an evaluation result of silver ion concentration and antibacterial performance concerning the work example of this invention.

[Drawing 4]It is influence on the flow of the electrolysis vessel concerning the work example of this invention.

[Drawing 5]It is a figure of a control section and an indicator concerning the work example of this invention.

[Explanations of letters or numerals]A [-- Relief valve 103 / -- Wash container 240 / -- Control unit 106 / -- Pouring mouth 210 / -- Flow rate sensor 290a / -- Water flow pipe 290a] -- Cleaning equipment B -- Silver ion water generating device 100 -- Cock 110 of a waterworks